IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

Claims 1-35 are cancelled.

36. (currently amended) A method for implementing extensible network-attached storage in a system including a plurality of computers, at least one secondary storage apparatus having a storage medium that can save data after shutting down a power source and an active network storage controller, and a network or input/output (I/O) cable for connecting said computers with said secondary storage apparatus, wherein said secondary storage apparatus includes a plurality of storage units and said active network storage controller is equipped with a block access module which provides said computers with a block-based I/O function for reading data from one of said storage units or writing data to one of said storage units, wherein at least one application program is deployed in a first computer and said application program issues object-based I/O requests to said secondary storage apparatus, each ~~request~~ requesting for reading application data from a plurality of non-contiguous storage units of said secondary storage apparatus or for writing application data to a plurality of non-contiguous storage units of said secondary storage apparatus~~inputting to or from said secondary storage apparatus of application data stretching over a plurality of non-contiguous storage units of said secondary storage apparatus~~, said method comprising the steps of:

sending to said secondary storage apparatus from the first computer, or a second computer different from the first computer, an object access module that implements an object-based I/O function to reply to object-based I/O requests using the block-based I/O function of said block access module;

registering said object access module in said active network storage controller to provide the ~~object-based I/O function with the~~ secondary storage apparatus with the object-based I/O function;

receiving in said secondary storage apparatus from the first computer an object-based I/O request for said application data; and

performing said object-based I/O request by executing said object access module.

37. (previously presented) A method according to claim 36, wherein said object access module obtains a data value or location of data in a storage unit corresponding to a specification, which is either an object, an object offset, an object offset size, or an object tag specifying the type of data to be retrieved.

38. (currently amended) A method for implementing extensible network-attached second storage in a system including a plurality of computers, at least one secondary storage apparatus having a storage medium that can save data after shutting down a power source and an active network storage controller, and a network or input/output (I/O) cable for connecting said computers with said secondary storage

apparatus, wherein said secondary storage apparatus includes a plurality of storage units and said active network storage controller is equipped with a block access module which provides said computers with a block-based I/O function for reading data from one of said storage units or writing data to one of said storage units, wherein at least one application program is deployed in a first computer and said application program issues object-based I/O requests to said secondary storage apparatus, each ~~request~~ requesting for reading application data from a plurality of non-contiguous storage units of said secondary storage apparatus or for writing application data to plurality of non-contiguous storage units of said secondary storage apparatus~~input or output to or from said secondary storage apparatus of application data stretching over a plurality of non-contiguous storage units of said secondary storage apparatus~~, said method comprising the steps of:

sending to said secondary storage apparatus from the first computer, or a second computer different from the first computer, an object access module that implements an object-based I/O function to reply object-based I/O requests using the block-based I/O function of said block access module;

registering said object access module in said active network storage controller to provide the ~~object-based I/O function with the~~ secondary storage apparatus with the object-based I/O function;

sending to said secondary storage apparatus from the first computer, or the second computer, object description data indicating how said application data is stored on said secondary storage apparatus;

registering said object description data in the registered object access module;

receiving in said secondary storage apparatus from the first computer an object-based I/O request for said application data; and

performing said object-based I/O request by executing said object access module using said object description data.

39. (previously presented) A method according to claim 38, wherein said object description data is data for specifying an attribute or an inter-block reference based
on an offset and size of said application data.

40. (previously presented) A method according to claim 38, wherein said object description data is data for specifying an attribute or an inter-block reference by a lexical analyzing program or a parser generating grammar of said application data.

41. (previously presented) A method according to claim 38, wherein said object description data is data for specifying a file format of said application data based on whether the data stored in a specific part of one or more storage units contain some specific value or pattern.

42. (currently amended) A method for implementing extensible network-attached second storage in a system including a plurality of computers, at least one

secondary storage apparatus having a storage medium that can save data after shutting down a power source and an active network storage controller, and a network or input/output (I/O) cable for connecting said computers with said secondary storage apparatus, wherein said secondary storage apparatus includes a plurality of storage units and said active network storage controller is equipped with a plurality of block access module, each providing ~~which provides~~ said computers commonly with a block-based I/O function for reading data from one of said storage units ~~a plurality of non-contiguous storage units of said secondary storage units~~ or writing data to one of said secondary storage unit, and ~~a plurality of non-contiguous storage units of said secondary storage units,~~ wherein at least one application program is deployed in a first computer, and wherein, said application program issues advanced I/O requests to said secondary storage apparatus each requesting processing of application data, said method comprising the steps of:

maintaining in said active network storage controller a plurality of object access modules, each providing other modules with an object-based I/O function as a common function for various applications by invoking one of said block access modules;

sending to said secondary storage apparatus from the first computer, or a second computer different from the first computer, an advanced function module that implements an advanced ~~object-based~~ I/O function for said application program by invoking at least one of said object access modules;~~to reply to advanced I/O requests using the object-based I/O function of said object access module;~~

registering said advanced function module in said active network storage controller to provide the advanced I/O function with the secondary storage apparatus;

receiving in said secondary storage apparatus from the first computer an advanced I/O request for said application data; and

performing said object-based I/O request by executing said advanced function ~~object access~~ module.